

Notice of Allowability

Application No.

10/600,063

Examiner

Shew-Fen Lin

Applicant(s)

OLSTAD ET AL.

Art Unit

2166

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 11/7/2006.
2. ☒ The allowed claim(s) is/are 1-5, 14-17, 19-20, 25-28, 30-31 and 33.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 12/6/2006.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


MOHAMMAD ALI
PRIMARY EXAMINER

DETAILED ACTION

- a. This action is responsive to amendment filed on 11/7/2006.
- b. Claims 1-5, 14-17, 19-20, 25-28, 30-31, and 33 are allowed (renumbered as claims 1-18). Claims 6-13, 18, 21-24, 29, and 32 have been cancelled.

Examiner's Amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Scott A. Stinebruner on December 6, 2006.

Please amend the claims which was filed on 11/7/2006, as follows:

1. (Currently Amended) A computer-implemented method of accessing a data structure, the method comprising:

initializing a flux count associated with a data structure to an even value;

in response to a request to modify the data structure, sequentially and in order:

incrementing the flux count to an odd value;

acquiring an exclusive serialization mechanism for the data structure;

modifying the data structure;

releasing the exclusive serialization mechanism; and

incrementing the flux count to an even value; and

in response to a request to access data from the data structure, sequentially and in order:

copying the flux count to obtain a first copy of the flux count;

copying the requested data from the data structure to obtain a copy of the requested data;

copying the flux count to obtain a second copy of the flux count; and

determining that the copy of the requested data is valid if the first copy of the flux count is an even value and the first and second copies of the flux count are equal to the flux count.

5. (Currently Amended) A computer-implemented method of accessing a data structure, the method comprising:

in connection with modifying the data structure:

prior to modifying the data structure, updating a flux indicator associated with the data structure from a first state to a second state to indicate that the data structure is in the process of being modified; and

after modifying the data structure, updating the flux indicator to a third state to indicate that the data structure is no longer in the process of being modified, wherein the third state is different from each of the first and second states; and

in connection with accessing data from the data structure:

obtaining a first copy of the flux indicator in connection with obtaining a copy of data from the data structure;

obtaining a second copy of the flux indicator after obtaining the copy of the data from the data structure; and

determining that the copy of the data from the data structure is valid if the first copy of the flux indicator does not indicate that the data structure is in the process of being modified and if the first and second copies of the flux indicator have the same state;

wherein the flux indicator includes a count value, wherein the first state of the flux indicator includes an even count value, wherein updating the flux indicator from the first state to the second state includes incrementing the flux indicator to an odd count value, wherein updating the flux indicator to the third state includes incrementing the flux indicator to an even count value,

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and wherein determining that the copy of the data from the data structure is valid includes determining if the count values for the first and second copies of the flux indicator are equal and determining if the first copy of the flux indicator is set to an even count value, and wherein modifying the data structure further includes, after updating the flux indicator from the first state to the second state and before updating the flux indicator to the third state, acquiring an exclusive serialization mechanism for the data structure, thereafter modifying the data structure, and thereafter releasing the exclusive serialization mechanism.

18. (Canceled).

20. (Currently Amended) An apparatus, comprising:

- a memory and at least one processor;
- a data structure resident in the memory;
- a flux indicator associated with the data structure;

first program code configured to execute on the at least one processor to modify the data structure, the first program code configured to, prior to modifying the data structure, update the flux indicator from a first state to a second state to indicate that the data structure is in the process of being modified, and, after modifying the data structure, update the flux indicator to a third state to indicate that the data structure is no longer in the process of being modified, wherein the third state is different from each of the first and second states; and

second program code configured to execute on the at least one processor to access data from the data structure, the second program code configured to obtain a first copy of the flux indicator in connection with obtaining a copy of data from the data structure, obtain a second copy of the flux indicator after obtaining the copy of the data from the data structure, and determine that the copy of the data from the data structure is valid if the first copy of the flux indicator does not indicate that the data structure is in the process of being modified and if the first and second copies of the flux indicator have the same state;

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wherein the flux indicator includes a count value, wherein the first state of the flux indicator includes one of an even and an odd count value, wherein the first program code is configured to, if the first state of the flux indicator is an even count value, update the flux indicator from the first state to the second state by incrementing the flux indicator to an odd count value, and if the first state of the flux indicator is an odd count value, update the flux indicator from the first state to the second state by incrementing the flux indicator to an even count value, wherein the first program code is configured to, if the first state of the flux indicator is an even count value, update the flux indicator to the third state by incrementing the flux indicator to an even count value, and if the first state of the flux indicator is an odd count value, update the flux indicator to the third state by incrementing the flux indicator to an odd count value, ~~and~~ wherein the second program code is configured to, if the first state of the flux indicator is an even count value, determine that the copy of the data from the data structure is valid by determining if the count values for the first and second copies of the flux indicator are equal and determining if the first copy of the flux indicator is set to an even count value, and if the first state of the flux indicator is an odd count value, determine that the copy of the data from the data structure is valid by determining if the count values for the first and second copies of the flux indicator are equal and determining if the first copy of the flux indicator is set to an odd count value, and wherein the first program code is configured to modify the data structure by, after updating the flux indicator from the first state to the second state and before updating the flux indicator to the third state, acquiring an exclusive serialization mechanism for the data structure, thereafter modifying the data structure, and thereafter releasing the exclusive serialization mechanism.

29. (Canceled).

31. (Currently Amended) A program product, comprising:

first program code configured to modify a data structure, the first program code configured to, prior to modifying the data structure, update a flux indicator associated with the data structure from a first state to a second state to indicate that the data structure is in the process of being modified, and, after modifying the data structure, update the flux indicator to a third state to indicate that the data structure is no longer in the process

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of being modified, wherein the third state is different from each of the first and second states;

second program code configured to access data from the data structure, the second program code configured to obtain a first copy of the flux indicator in connection with obtaining a copy of data from the data structure, obtain a second copy of the flux indicator after obtaining the copy of the data from the data structure, and determine that the copy of the data from the data structure is valid if the first copy of the flux indicator does not indicate that the data structure is in the process of being modified and if the first and second copies of the flux indicator have the same state; and

a tangible computer readable storage medium bearing the first and second program code;

wherein the flux indicator includes a count value, wherein the first state of the flux indicator includes one of an even and an odd count value, wherein the first program code is configured to, if the first state of the flux indicator is an even count value, update the flux indicator from the first state to the second state by incrementing the flux indicator to an odd count value, and if the first state of the flux indicator is an odd count value, update the flux indicator from the first state to the second state by incrementing the flux indicator to an even count value, wherein the first program code is configured to, if the first state of the flux indicator is an even count value, update the flux indicator to the third state by incrementing the flux indicator to an even count value, and if the first state of the flux indicator is an odd count value, update the flux indicator to the third state by incrementing the flux indicator to an odd count value, and wherein the second program code is configured to, if the first state of the flux indicator is an even count value, determine that the copy of the data from the data structure is valid by determining if the count values for the first and second copies of the flux indicator are equal and determining if the first copy of the flux indicator is set to an even count value, and if the first state of the flux indicator is an odd count value, determine that the copy of the data from the data structure is valid by determining if the count values for the first and second copies of the flux indicator are equal and determining if the first copy of the flux indicator is set to an odd count value, and wherein the first program code is configured to modify the data structure by, after updating the flux indicator from the first state to the second state and before updating the flux indicator to the third state,

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acquiring an exclusive serialization mechanism for the data structure, thereafter modifying the data structure, and thereafter releasing the exclusive serialization mechanism.

33. (Currently Amended) A computer-implemented method of accessing a data structure, the method comprising:

in connection with modifying the data structure:

prior to modifying the data structure, updating a flux indicator associated with the data structure from a first state to a second state to indicate that the data structure is in the process of being modified; and

after modifying the data structure, updating the flux indicator to a third state to indicate that the data structure is no longer in the process of being modified, wherein the third state is different from each of the first and second states; and

in connection with accessing data from the data structure:

obtaining a first copy of the flux indicator in connection with obtaining a copy of data from the data structure;

obtaining a second copy of the flux indicator after obtaining the copy of the data from the data structure; and

determining that the copy of the data from the data structure is valid if the first copy of the flux indicator does not indicate that the data structure is in the process of being modified and if the first and second copies of the flux indicator have the same state;

wherein the flux indicator includes a count value, wherein the first state of the flux indicator includes an odd count value, wherein updating the flux indicator from the first state to the second state includes incrementing the flux indicator to an even count value, wherein updating the flux indicator to the third state includes incrementing the flux indicator to an odd count value, and wherein determining that the copy of the data from the data structure is valid includes determining if the count values for the first and second copies of the flux indicator are equal and determining if the first copy of the flux indicator is set to an odd count value, and wherein modifying the data structure further includes, after updating the flux indicator from the first state

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to the second state and before updating the flux indicator to the third state, acquiring an exclusive serialization mechanism for the data structure, thereafter modifying the data structure, and thereafter releasing the exclusive serialization mechanism.

Reasons for Allow

The following is an examiner's statement of reasons for allowance:

Independent claims 1, 5, 20, 31, and 33 each recites, among other limitations, the limitation of "incrementing the flux count to an odd/even value; acquiring an exclusive serialization mechanism for the data structure; modifying the data structure; releasing the exclusive serialization mechanism; and incrementing the flux count to an even/odd value".

It is noted that many prior arts (for example, Tavares et al. US Patent 5,307,487) teach using two counters to validate data for read/write without locking, but none of them teaches this limitation of "flux counter" and "exclusive serialization" for the data modification. The patentability of Applicants' invention was examined and evaluated against the prior art listed below. These prior art are considered pertinent to the subject matter of Applicants' invention, as discussed next,

- Mi Kyoung et al., US 20030120669 A1, "Duplex structure of main-memory DBMS using log information in diskless environment and method for controlling consistency of data of main-memory DBMS".

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- Scoredos, Eric C., US 20040249812 A1, "Method and program product for reducing database walk frequency while repetitively accessing a firewall connection and rule database".
- Tavares; Carlos M. et al., US 5307487 A, "Method of database synchronization with consistency determined by entry and exit counters used on both update and retrieval".
- Gupta; Rajiiv et al., US 5710881 A, "Data merging method and apparatus for shared memory multiprocessing computer systems".
- Novak; Lars et al., US 6393419 B1, "Multipoint database synchronization protocol to avoid data corruption".
- Weedon; Jonathan K., US 6718349 B2, "Intelligent, optimistic concurrency database access scheme".

However, none of the prior art of the record teaches or suggests, independently or in combination, the combination of claimed elements including the specific features recited by the independent claims, 1, 5, 20, 31, and 33 as indicated above.

The dependent claims, being definite, further limiting, and fully enabled by the specification and are also allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shew-Fen Lin whose telephone number is 571-272-2672. The examiner can normally be reached on 8:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain Alam can be reached on 571-272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Shew-Fen Lin
Patent Examiner

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December 8, 2006



MOHAMMAD ALI
PRIMARY EXAMINER